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ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/501,691	ODA ET AL.	
	Examiner	Art Unit	
	Robert T. Crow	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 May 2007 has been entered.

Status of the Claims

2. This action is in response to papers filed 21 May 2007 in which claims 1 and 6 were amended, no claims were canceled, and new claims 8-9 were added. All of the amendments have been thoroughly reviewed and entered.

The previous rejections under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) not reiterated below are withdrawn in view of the amendments. Applicant's arguments have been thoroughly reviewed and are addressed following the rejections necessitated by the amendments.

Claims 1 and 3-9 are under prosecution.

Information Disclosure Statement

3. The Information Disclosure Statement filed 16 July 2004 was previously acknowledged. The examiner has obtained a machine translation the "Detailed Description" of JP 2001-281246. The document is now fully considered. The Information Disclosure Statement is updated to prove a signature indicating the examiner's consideration of the machine translation of the "Detailed Description" document. The remaining JP documents are already on the record, and have been lined through to avoid duplication.

Claim Objections

34. Claims 8-9 are objected to because of the following informalities: claims 8 and 9 each recite "an oligonucleotide of 50mer." This appears to be a grammatical error. It is suggested that the claim be amended to read "an oligonucleotide having a length of 50 bases." Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is indefinite in the reaction "is used for analysis of the nucleic acid by hybridization" at the end of the claim. The phrase "is used for" renders the claim indefinite because it is unclear if the analysis of the nucleic acid by hybridization is part of the claimed method or a recitation of intended use for the carrier produced by the claimed method. It is suggested that the claim be amended to reflect only **active method steps** that are part of the instantly claimed method.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3, and 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobsen et al (U.S. Patent No. 6,033,784, issued 7 March 2000).

Regarding claim 1, Jacobsen et al teach a method for immobilizing a biomolecule on a carrier. In a single exemplary embodiment, Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a single biomolecule

Jacobsen et al also teach a solution consisting of a biomolecule, in the form of a peptide that is N-terminally anthraquinone substituted, and a solvent, in the form of water, is added (i.e., spotted) to each well of a plate (column 22, lines 22-30), wherein the plate is the carrier and the substituted peptide is a biomolecule.

Jacobsen et al also teach the carrier is then irradiated under a UV lamp (column 22, lines 29-31) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 190-820 nm (column 19, lines 47-67). Jacobsen et al also teach the carrier is a thermoplastic resin; namely, the substrate is the carbon containing polymer surface polycarbonate (Abstract and column 8, lines 9-21). Jacobsen et al also teach the substrates do not require a coating; namely, Jacobsen et al teach that the thermoplastic resin may be premodified with a coating (column 8, lines 10-35).

It is noted that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). See also *Upsher-Smith Labs. v. Pamlab, LLC*, 412 F.3d 1319, 1323, 75 USPQ2d 1213, 1215 (Fed. Cir. 2005)(reference disclosing optional inclusion of a particular component teaches compositions that both do and do not contain that component); Celeritas Technologies Ltd. v. Rockwell International Corp., 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir. 1998) (The court held that the prior art anticipated the claims even though it

taught away from the claimed invention. "The fact that a modem with a single carrier data signal is shown to be less than optimal does not vitiate the fact that it is disclosed."). Thus, the teaching of Jacobsen et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic coating is **not** premodified with a coating. See MPEP § 2123 [R-5].

Regarding claim 3, Jacobsen et al teach the method of claim 1, wherein the carrier is made of polycarbonate (column 8, lines 9-21).

Regarding claim 5, Jacobsen et al teach the method of claim 1, wherein the biomolecule is a protein; namely, a peptide compound that is N-terminally anthraquinone substituted (column 22, lines 22-30).

Regarding claim 6, Jacobsen et al teach a method for producing a biomolecule-immobilized carrier. In a single exemplary embodiment, Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a single biomolecule

Jacobsen et al also teach a solution consisting of a biomolecule, in the form of a peptide that is N-terminally anthraquinone substituted, and a solvent, in the form of water, is added (i.e., spotted) to each well of a plate (column 22, lines 22-30), wherein the plate is the carrier and the substituted peptide is a biomolecule.

Jacobsen et al also teach the carrier is then irradiated under a UV lamp (column 22, lines 29-31) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 190-820 nm (column 19, lines 47-67). Jacobsen et al also teach the carrier is a thermoplastic resin; namely, the substrate is the carbon containing polymer surface polycarbonate (Abstract and column 8,

lines 9-21). Jacobsen et al also teach the substrates do not require a coating; namely, Jacobsen et al teach that the thermoplastic resin may be premodified with a coating (column 8, lines 10-35).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Jacobsen et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic coating is **not** premodified with a coating.

Response to Arguments

Applicant's arguments filed 21 May 2007 (i.e., the "Remarks") have been fully considered but they are not persuasive for the reason(s) listed below.

Applicant argues on page 5 of the Remarks that the claim does not encompass the use of a ligand or other molecule as taught by Jacobsen et al, and the claims are therefore not anticipated by Jacobsen et al.

However, as noted above, the "ligand" of Jacobsen et al is in fact the biomolecule of the instant claims. Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a **single** biomolecule. No "other" molecule is present, and the solution of Jacobsen et al consists of the single biomolecule and a solvent in the form of water (column 22, lines 22-30).

9. Claims 1 and 3-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Gagna (U.S. patent Application Publication No. US 2003/0096273 A1, published 22 May 2003).

Regarding claim 1, Gagna teach a method for immobilizing a biomolecule on a carrier. In a single exemplary embodiment, Gagna teaches spotting biomolecules onto plastic solid supports (paragraph

0008), wherein nucleic acids are biomolecules and solid supports are carriers. The nucleic acids are spotted on the carrier in an appropriate buffer (paragraph 0138), wherein the buffer is 10X SSC (paragraphs 0123-138). SSC buffer is a sodium citrate/sodium chloride buffer, which is a solvent in accordance with the definition of a "solvent" on page 8 of the instant specification.

Gagna also teaches UV irradiation at 245-330 nm (paragraph 0141), which is an ultraviolet ray having a component at 280 nm. Gagna et al teach the carriers are uncoated slides of the thermoplastic resin polystyrene (paragraph 0168).

Regarding claim 3, Gagna et al teach the method of claim 1, wherein the carrier is polystyrene (paragraph 0168).

Regarding claim 4, Gagna et al teach the method of claim 1, wherein the irradiation does is 120 mJ/cm2 (paragraph 0141), which is more than 100 mJ/cm2.

Regarding claim 5, Gagna et al teach the method of claim 1, wherein the biomolecule is a nucleic acid (paragraph 0008).

Regarding claim 6, Gagna teach a method for producing a biomolecule-immobilized carrier. In a single exemplary embodiment, Gagna teaches spotting biomolecules onto plastic solid supports (paragraph 0008), wherein nucleic acids are biomolecules and solid supports are carriers. The nucleic acids are spotted on the carrier in an appropriate buffer (paragraph 0138), wherein the buffer is 10X SSC (paragraphs 0123-138). SSC buffer is a sodium citrate/sodium chloride buffer, which is a solvent in accordance with the definition of a "solvent" on page 8 of the instant specification.

Gagna also teaches UV irradiation at 245-330 nm (paragraph 0141), which is a range encompassing an ultraviolet ray having a component at 280 nm. Gagna teaches the carriers are uncoated slides of the thermoplastic resin polystyrene (paragraph 0168).

Regarding claim 7, Gagna teaches the method of claim 1, wherein the biomolecule is a nucleic acid (paragraph 0008). Gagna also teaches the carrier is used for analysis of the nucleic acid by

hybridization; namely, the immobilized nucleic acids are used to analyze B and Z nucleic acid structures (paragraph 0013), which comprises hybridization.

Regarding claim 8-9, Gagna teaches the method of claims 1 and 6, wherein the biomolecule is an oligonucleotide of 50mer or shorter; namely, oligomers that are about 50-mers (paragraph 0020).

10. Claims 1 and 3-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kimura et al (Japanese Patent Application Publication No. 2001-281246, published 10 October 2001). Citations are to the machine translation of the document provided by the National Center of Industrial Property Information and Training website <http://www.ipdl.ncipi.go.jp/homepg_e.ipdl>).

Regarding claim 1, Kimura et al teach a method of immobilizing a biomolecule on a carrier. In a single exemplary embodiment, Kimura et al teach immobilizing (i.e., fixing) a nucleic acid on a base material (paragraph 0009), wherein a nucleic acid is a biomolecule and the base material is a carrier. Kimura et al also teach the nucleic acid is supplied in water (paragraph 0046); thus, the spotting utilizes a solution consisting of the biomolecule and a solvent. Kimura et al further teach the immobilization is accomplished using ultraviolet rays with a wavelength of 220 nm-380 nm (paragraph 0047), which is a range encompassing an ultraviolet ray having a component at 280 nm.

Kimura et al teach the nucleic acid is immobilized on the thermoplastic resin polystyrene (paragraphs 0020-0021). Kimura et al also teach the carrier does not require a coating; namely, Kimura et al teach that the base material may have a coating (paragraph 0037).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Kimura et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic resin is **not** premodified with a coating.

Regarding claim 3, Kimura et al teach the method of claim 1, wherein the carrier is made of polystyrene (paragraphs 0020-0021

Regarding claim 4, Kimura et al teach the method of claim 1, wherein the irradiation dose of the ultraviolet ray is greater than 100 mJ/cm2; namely, 100-2000 mJ/cm2 (paragraph 0047).

Regarding claim 5, Kimura et al teach the method of claim 1, wherein the biomolecule is a nucleic acid (paragraph 0009).

Regarding claim 6, Kimura et al teach a method of producing a biomolecule-immobilized carrier. In a single exemplary embodiment, Kimura et al teach immobilizing (i.e., fixing) a nucleic acid on a base material (paragraph 0009), wherein a nucleic acid is a biomolecule and the base material is a carrier. Kimura et al also teach the nucleic acid is supplied in water (paragraph 0046); thus, the spotting utilizes a solution consisting of the biomolecule and a solvent. Kimura et al further teach the immobilization is accomplished using ultraviolet rays with a wavelength of 220 nm-380 nm (paragraph 0047), which is a range encompassing an ultraviolet ray having a component at 280 nm.

Kimura et al teach the nucleic acid is immobilized on the thermoplastic resin polystyrene (paragraphs 0020-0021). Kimura et al also teach the carrier does not require a coating; namely, Kimura et al teach that the base material may have a coating (paragraph 0037).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Kimura et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic resin is **not** premodified with a coating.

Regarding claim 7, Kimura e al teach the method of claim 6, wherein the biomolecule is a nucleic acid (paragraph 0009), and the carrier is used for analysis of the nucleic acid by hybridization (paragraph 0010).

Regarding claims 8-9, Kimura et al teach the method of claims 1 and 6, wherein the biomolecule is an oligonucleotide of 50 mer or shorter; namely 10 bases (paragraph 0012).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1, 4, and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen et al (U.S. Patent No. 6,033,784, issued 7 March 2000) in view of Zimlich et al (U.S. Patent No. 5,288,647, issued 22 February 1994).

Regarding claim 4, Jacobsen et al teach the method of claim 1 for immobilizing a biomolecule on a carrier. In a single exemplary embodiment, Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a single biomolecule

Jacobsen et al also teach a solution consisting of a biomolecule, in the form of a peptide that is N-terminally anthraquinone substituted, and a solvent, in the form of water, is added (i.e., spotted) to each

well of a plate (column 22, lines 22-30), wherein the plate is the carrier and the substituted peptide is a biomolecule.

Jacobsen et al also teach the carrier is then irradiated under a UV lamp (column 22, lines 29-31) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 190-820 nm (column 19, lines 47-67). Jacobsen et al also teach the carrier is a thermoplastic resin; namely, the substrate is the carbon containing polymer surface polycarbonate (Abstract and column 8, lines 9-21). Jacobsen et al also teach the substrates do not require a coating; namely, Jacobsen et al teach that the thermoplastic resin may be premodified with a coating (column 8, lines 10-35).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Jacobsen et al that the thermoplastic resin may be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic coating is not premodified with a coating.

Jacobsen et al are silent with respect to the dose.

However, Zimlich et al teach a method for immobilizing a biomolecule on a carrier; namely, a polynucleotide is disposed (i.e., spotted) on a substrate (column 4, lines 35-37), wherein the substrate is the carrier. Zimlich et al also teach the carrier is then irradiated under a UV lamp (column 4, lines 35-42) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 200-290 nm. Zimlich et al also teach the irradiation dose is more than 100 mJ/cm^2; namely, the dies is 1.23 kJ/m^2, which is 129 mJ/cm^2 (column 6, lines 42-45) with the added advantage that the irradiation dose produces good results even with variations in the substrate and other conditions (column 6, lines 42-45).

It would therefore have been obvious to a person of ordinary skill in the art at the time the claimed invention was made to have modified the method as taught by Jacobsen et al with the dose as taught by Zimlich et al with a reasonable expectation of success. The teachings of Zimlich et al are evidence that the dose was known in the prior art at the time the claimed invention was made. The

ordinary artisan would have been motivated to make such a modification because said modification would have resulted in a method having the added advantage of good results of immobilization even with variations in the substrate and other conditions as explicitly taught by Zimlich et al (column 6, lines 42-45).

Regarding claim 7, Jacobsen et al teach the method of claim 6 for producing a biomolecule-immobilized carrier. In a single exemplary embodiment, Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a single biomolecule

Jacobsen et al also teach a solution consisting of a biomolecule, in the form of a peptide that is N-terminally anthraquinone substituted, and a solvent, in the form of water, is added (i.e., spotted) to each well of a plate (column 22, lines 22-30), wherein the plate is the carrier and the substituted peptide is a biomolecule.

Jacobsen et al also teach the carrier is then irradiated under a UV lamp (column 22, lines 29-31) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 190-820 nm (column 19, lines 47-67). Jacobsen et al also teach the carrier is a thermoplastic resin; namely, the substrate is the carbon containing polymer surface polycarbonate (Abstract and column 8, lines 9-21). Jacobsen et al also teach the substrates do not require a coating; namely, Jacobsen et al teach that the thermoplastic resin may be premodified with a coating (column 8, lines 10-35).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Jacobsen et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic coating is **not** premodified with a coating.

Jacobsen et al are silent with respect to hybridization.

However, Zimlich et al teach a method for producing a biomolecule immobilized carrier; namely, a polynucleotide is disposed (i.e., spotted) on a substrate (column 4, lines 35-37), wherein the substrate is the carrier. Zimlich et al also teach the carrier is then irradiated under a UV lamp (column 4, lines 35-42). Zimlich et al also teach the immobilized nucleic acid probes on the nylon membranes are hybridized (column 1, lines 15-25) with the added advantage that hybridization allows DNA sequencing to be performed (column 1, lines 15-20).

It would therefore have been obvious to a person of ordinary skill in the art at the time the claimed invention was made to have modified the method as taught by Jacobsen et al with hybridization as taught by Zimlich et al with a reasonable expectation of success. The teachings of Zimlich et al are evidence that using the carrier for hybridization was known in the prior art at the time the claimed invention was made. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in a method having the added advantage of allowing DNA sequencing to be performed as explicitly taught by Zimlich et al (column 1, lines 15-20).

Response to Arguments

A. On pages 5-6 of the Remarks, Applicant reiterates the arguments on page 5 of the Remarks that the claim does not encompass the use of a ligand or other molecule as taught by Jacobsen et al, and the claims are therefore not obvious over Jacobsen et al in view of Zimlich et al. These arguments were not persuasive as addressed above in Section 7.

B. Applicant further argues on page 6 of the Remarks that because Zimlich et al teach immobilization to completely different carrier materials, there is no motivation to combine the teachings of Zimlich et al with those of Jacobsen et al.

However, Zimlich is relied upon solely for the irradiation dose of the ultraviolet ray and the use of the carrier for nucleic acid hybridization, and is not relied upon for the carrier material.

Further, as noted above, Zimlich et al **explicitly** teach the radiation dose produces good results **even with variations in the substrate** (i.e., carrier) and other conditions (column 6, lines 42-45). Thus, the ordinary artisan would have been explicitly motivated to use the irradiation dose of Zimlich et al with other carriers with a reasonable expectation of obtaining good results.

C. Applicant also argues on page 6 of the Remarks that Zimlich et al does not teach or suggest other variations of carrier material.

However, as noted above, Zimlich et al **explicitly** teach the radiation dose produces good results **even with variations in the substrate** (i.e., carrier) and other conditions (column 6, lines 42-45). Thus, the ordinary artisan would have been explicitly motivated to use the irradiation dose of Zimlich et al with other carriers with a reasonable expectation of obtaining good results.

14. Claims 1, 6, and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen et al (U.S. Patent No. 6,033,784, issued 7 March 2000) in view of Heller (U.S. Patent No. 6,017,696, issued 25 January 2000).

Regarding claims 8-9, Jacobsen et al teach the method of claim 1 for immobilizing a biomolecule on a carrier. In a single exemplary embodiment, Jacobsen et al explicitly teach a "total Q-S-L molecule" that is **subsequently** linked to the polymer [column 7, lines 9-15 and column 8, lines 55-67, embodiment "b)"]. Jacobsen et al define Q as the photochemically reactive anthraquinone, S as a spacer, and L as the ligand (column 3, lines 36-40), wherein the ligand is a biomolecule (column 6, lines 35-60). Thus, the "total Q-S-L molecule" is interpreted as a single biomolecule

Jacobsen et al also teach a solution consisting of a biomolecule, in the form of a peptide that is N-terminally anthraquinone substituted, and a solvent, in the form of water, is added (i.e., spotted) to each well of a plate (column 22, lines 22-30), wherein the plate is the carrier and the substituted peptide is a biomolecule.

Jacobsen et al also teach the carrier is then irradiated under a UV lamp (column 22, lines 29-31) containing a component having a wavelength of 280 nm; namely, the irradiation wavelengths are in the range of 190-820 nm (column 19, lines 47-67). Jacobsen et al also teach the carrier is a thermoplastic resin; namely, the substrate is the carbon containing polymer surface polycarbonate (Abstract and column 8, lines 9-21). Jacobsen et al also teach the substrates do not require a coating; namely, Jacobsen et al teach that the thermoplastic resin may be premodified with a coating (column 8, lines 10-35).

As noted above, that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Thus, the teaching of Jacobsen et al that the thermoplastic resin **may** be premodified with a coating encompasses the alternate embodiment wherein the thermoplastic coating is **not** premodified with a coating.

Jacobsen et al also teach the method of claim 6; namely, the steps of the method of claim 1 as detailed above produce a biomolecule-immobilized carrier.

Jacobsen et al do not teach the nucleic acids are 50-mers or shorter.

However, Heller teaches immobilized nucleic acids are oligonucleotides that are 8-mers to 21-mers, which have the added advantage of allowing use for point mutation detection (column 23, lines 10-25), which aids in the detection of genetic diseases.

It would therefore have been obvious to a person of ordinary skill in the art at the time the claimed invention was made to have modified the method comprising immobilization of oligonucleotides as taught by Jacobsen et al with the oligonucleotide lengths as taught by Heller with a reasonable expectation of success. The teachings of Heller are evidence that the oligonucleotide lengths were known in the prior art at the time the claimed invention was made. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in a method having the added advantage the detection of genetic diseases as a result of point mutation detection as explicitly taught by Heller (column 23, lines 10-25).

Conclusion

15. No claim is allowed.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert T. Crow whose telephone number is (571) 272-1113. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JEHANNE SITTON
PRIMARY EXAMINER
7/25/07

Robert T. Crow
Examiner
Art Unit 1634